According to this arrangement, the light emitting element **32** is fixed in the ring **38** that is mounted on the moving end of the scanner **28**, so that the relative optical positions of the element **32** and the back surface of the cantilever **30** can be kept constant without being influenced by the state of displacement of the moving end of the scanner **28** during the SPM measurement.

Thus, the measurement light beam emitted from the light emitting element **32** can always be applied at the constant angle of incidence to the constant position on the back surface of the cantilever **30** during the SPM measurement. The reflected light from the back surface of the cantilever **30** is applied to the light receiving surface of the light receiving element **34** that is aligned with the center Q, and is converted into an electrical signal corresponding to the change of the quantity of received light. In consequence, accurate SPM measurement information (irregularity information on the sample, etc.) can be obtained without involving noises.

According to the present embodiment, the scanning probe microscope need not be provided with the complicated position adjusting mechanism that is required in each of the foregoing embodiments. Once the respective positions of the light emitting and receiving elements **32** and **34** are adjusted, moreover, the measurement light beam emitted from the light emitting element **32** can always be applied at the constant angle of incidence to the constant position on the back surface of the cantilever **30** without being influenced by the hysteresis, creep, etc. of the scanner **28** in the SPM measurement in the subsequent stage. Thus, there is no need of pre-scanning that is required by the arrangement of the first embodiment.

In any of the embodiments described herein, the measurement light beam from the light emitting element is applied to the back surface of the cantilever. Alternatively, however, the measurement light beam may be applied to the cantilever in the opposite direction, that is, to that surface of the cantilever on which the probe is provided, with the same effects of the foregoing embodiments and without departing from the scope or spirit of the present invention.

Additional advantages and modifications will readily occurs to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details and representative embodiments shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalents.

We claim:

1. A scanning probe microscope comprising:

a scanner having a moving end movable in three-dimensional directions and a stationary end fixed to a base;

a cantilever removably attached to the moving end of the scanner;

a displacement sensor including a light emitting element which applies a light beam to the cantilever and a light receiving element which receives reflected light from the cantilever, whereby the displacement of the cantilever is detected optically; and

a position adjusting mechanism which is attached to the base, and which adjusts the position of the displacement sensor so that the light beam emitted from the light emitting element can be applied at a constant angle of incidence to a constant position on the cantilever while the moving end of the scanner is being moved.

2. A scanning probe microscope according to claim **1**, wherein said position adjusting mechanism includes a stationary system having a guide surface in a specific shape, a movable system movable along the guide surface of the stationary system in a manner such that the movable system supports the displacement sensor, and a drive system capable of adjusting the position of the displacement sensor by causing the movable system to move along the guide surface of the stationary system.

3. A scanning probe microscope according to claim **2**, wherein said drive system includes a plurality of actuators such that the movable system can be moved along the guide surface of the stationary system by driving the actuators in response to an electrical signal applied to the scanner.

4. A scanning probe microscope according to claim **2**, wherein said position adjusting mechanism further includes an additional sensor capable of optically detecting the displacement of the moving end of the scanner, so that the movable system can be moved along the guide surface of the stationary system by driving the drive system in accordance with the displacement of the moving end of the scanner.

5. A scanning probe microscope comprising:

a scanner having a moving end movable in three-dimensional directions;

a cantilever removably attached to the moving end of the scanner;

a displacement sensor including a light emitting element capable of applying a light beam to the cantilever and a light receiving element capable of receiving reflected light from the cantilever, whereby the displacement of the cantilever is detected optically; and

a position adjusting mechanism capable of adjusting the position of the displacement sensor so that the light beam emitted from the light emitting element can be applied to a constant position on the cantilever while the moving end of the scanner is being moved,

the position adjusting mechanism including a position adjusting scan unit having a moving end displaceable for a given distance in a given direction in response to an electrical signal applied to the scanner, the displacement sensor being attached to the moving end of the position adjusting scan unit.

6. A scanning probe microscope comprising:

a scanner having a moving end movable in three-dimensional directions;

a cantilever removably attached to the moving end of the scanner;

a displacement sensor including a light emitting element capable of applying a light beam to the cantilever and a light receiving element capable of receiving reflected light from the cantilever, whereby the displacement of the cantilever is detected optically; and

a position adjusting mechanism capable of adjusting the position of the displacement sensor so that the light beam emitted from the light emitting element can be applied to a constant position on the cantilever while the moving end of the scanner is being moved,

the position adjusting mechanism including an additional sensor capable of optically detecting the displacement of the moving end of the scanner and a position adjusting scan unit having a moving end displaceable for a given distance in a given direction in accordance with the displacement of the moving end of the scanner detected by means of the additional sensor, the displacement sensor being attached to the moving end of the position adjusting scan unit.